REMARKS/ARGUMENTS

Reconsideration of this application is respectfully requested in view of the foregoing amendments and discussion presented herein.

1. Rejection of Claims 1-7, 10-15, 19-24, 26-31, and 33-39 under 35 U.S.C. § 103(a).

Claims 1-6, 13-14, 19-21, 27-31 and 33-35 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Patel et al. (U.S. Patent No. 6,731,600) in view of Matsunaga (U.S. Publ. No. 2002/0141448).

Claims 7, 10-12, 15, 22-24, and 36-39 were rejected under 35 U.S.C. §103(a) as unpatentable over Patel et al. in view of Matsunaga, cited above, and further in view of Zhang (U.S. Publ. No. 2005/0144303).

Claim 26 was rejected under 35 U.S.C. §103(a) as unpatentable over Patel et al. in view of Zhang, cited above, and further in view of Matsunaga.

Claims 1, 14, 26 and 27 are independent claims. After carefully considering the grounds for rejection, the Applicant has amended Claims 1, 14, 26 and 27 and respectfully responds as follows.

In support of the rejection of Claims 1, 14 and 27, the Examiner asserted that the Patel / Matsunaga combination teaches all of the limitations of each of Claims 1, 14 and 27. In response to the rejection, the Applicant has amended Claims 1, 14 and 27 to include subject matter from Claim 26 (which was not rejected based on that Patel / Matsunaga combination) which was not taught by that combination, thereby rendering the rejection moot; namely, subject matter related to receipt acknowledgement (ACK) transmissions.

Therefore, the following discussion addresses the cited combination of Patel, Matsunaga, and Zhang as it relates to Claim 26 and amended Claims 1, 14 and 27. As will be shown, the cited combination does not teach the structures, actions and interdependencies which are recited in those claims, and, further, does not establish *prima facie* obviousness or any basis for an obvious rejection.

Patel

Patel is directed to a "*System and Method for Determining Network Conditions*" (from title of Patel reference) and it uses sending of a first and second packet (e.g., time stamp) from a server to a client and reporting the latency, as shown in FIG. 3 and FIG. 4 of that reference.

Combination of Patel and Matsunaga

The Examiner proposes the Patel / Matsunaga combination on the stated basis that "*Matsunaga did teach editing the maximum segment size to provide an indication*." In support, the Examiner refers to Matsunaga paragraph [0074] lines 6-12, and paragraph [0085] lines 1-7. *(Although the recitation of using the maximum segment size (MSS) to mark back-to-back packets has been removed from Claims 1 and 14, it still remains within Claim 27.)*

These cited paragraphs are duplicated below (with emphasis added).

> [0074] According to the first embodiment, the MSS option rewrite unit 306 in the packet fragmentation device 40 <u>determines the MSS value used between the transmitting hosts 10 and the packet transfer apparatus 20 so as to prevent the data segment size conversion ratio from exceeding an upper limit set in advance</u>. A too high ratio of a data segment size to be converted in the packet transfer apparatus 20 may cause burst data transfer and congestion of a network for transferring packets. These problems can be avoided by adjusting the data segment size conversion ratio by the MSS option rewrite unit 306 <u>so as not to exceed the upper limit</u> externally set in advance.
>
> [0085] <u>If the MSS value obtained from the MTU value of the next-hop network is smaller than the MSS used between the transmitting hosts 10 and the packet transfer apparatus 21, the MSS value used between the transmitting hosts 10 and the packet transfer apparatus 21 must be changed</u>. Thus, the received I CMP unreachable packet is directly transferred to the transmitting hosts.

It can be seen from the above, that the use of the MSS is conventional for controlling segment size in relation to the MTU, and that there is no mention or suggestion of altering packet sizes below the MSS <u>to provide for a substantially</u>

unrelated signaling purpose, and even more particularly toward indicating back-to-back packet status. It is well recognized in the field that the number of bytes of MSS + TCP header + IP header = MTU bytes. In the paragraphs upon which the Examiner relies, the Matsunaga reference simply alters MSS based on changing MTU values, such as "*the MTU value of the next-hop network is smaller*". MSS is not changed to provide a signaling means, but "*so as not to exceed the upper limit*", as Matsunaga states it.

Combination of Patel, Matsunaga and Zhang

In support of the rejection of Claim 26, the Examiner proposes the combination of Patel, Matsunaga and Zhang. In view of the amendments to Claims 1, 14 and 27, which add subject matter from Claim 26 that distinguishes over the Patel / Matsunaga combination, the Applicant discusses the Patel / Matsunaga / Zhang combination in relation to those claims as well as in relation to Claim 26 even though the combination was not cited against Claims 1, 14 and 27.

The Examiner cited Zhang in combination with the Patel and Matsunaga references as teaching, in Claim 26, "*controlling the length of packet trains transmitted by the sender in response to altering the rate at which receipt acknowledgements (ACKs) are communicated from the receiver to said sender as based on estimated network bandwidth*".

The section of Zhang relied upon by the Examiner comprises paragraph [0009], lines 3-9, but the entire paragraph is duplicated below for proper context.

> [0009] When these unexpected delays are due to handover happen, the typical TCP congestion control will interpret them as network congestion. Therefore, the congestion window shrinks to its minimum value (one segment) abruptly and begins to invoke the slow-start algorithm till an acknowledgment (ACK) reaches TCP transmitter. As ACK reach the TCP transmitter, slow-start algorithm begins to grow the congestion window exponentially until it reaches a threshold ssthresh, then grows it linearly. The threshold ssthresh is set to one half of the congestion window size at the time of the retransmission timeout. After handover completes for long time, the congestion window returns gradually to its previous level before the window shrinks, as shown in FIG. 3 by broken lines. Thus it takes a long time after handover completion until the congestion window returns gradually to its previous level. *(emphasis added)*

However, the above-referenced paragraph does not teach **the receiver** changing the **rate** at which it outputs ACKs in order to communicate to the sender the number of back-to-back packets to be sent. It will be noted that paragraph [0009] of Zhang indicates the sender is experiencing "*unexpected delays*" in receiving ACKS, in response to which the sender (transmitter) shrinks its congestion window, as "*the congestion window shrinks to its minimum value.*" The receiver is not taking the action, but indeed it is the sender who is taking an entirely different course of action in response to not receiving ACKs from the receiver.

It should be remembered that the TCP "*congestion window*" determines the number of bytes that can be outstanding between the two nodes at any given time, and works to prevent overloading the link between them with too much traffic. The size of this window is calculated by estimating how much congestion there is between the two places. This understanding of "*congestion window*" is well known, as seen from the description of the TCP congestion window found on the *www.wikipedia.com* website.

> Congestion window (From Wikipedia, the free encyclopedia)
> In Transmission Control Protocol (TCP), the congestion window, also called the TCP receive window, determines the number of bytes that can be outstanding at any time. This is a means of **stopping the link** between two places from getting overloaded with too much traffic. The size of this window is calculated by estimating how much congestion there is between the two places. The **sender** maintains the congestion window. When a connection is set up, the congestion window is set to the maximum segment size (MSS) allowed on that connection. Further variance in the collision window is dictated by an Additive Increase/Multiplicative Decrease approach. This means that if all segments are received **and the acknowledgments reach the sender on time**, some constant is added to the window size. The window keeps growing linearly until a timeout occurs or the receiver reaches its limit. If a timeout occurs, the window size is halved. A system administrator may adjust the maximum window size limit, or adjust the constant added during additive increase, as part of TCP tuning.
> *(emphasis added)*

Thus, it is readily understood that Zhang is not discussing a receiver which changes the number of packets which must be received per each ACK sent - which is

the "*rate of acknowledgements*" as recited in Applicant Claim 26. In contrast to Applicant claims, Zhang is discussing what action the SENDER takes as it has not received ACKs back from the receiver because of congestion, whereby the congestion window is set by the sender to less than maximum segment size (MSS) as specifically to the "*minimum value (one segment)*" as taught by Zhang. Reiterating the above, the asserted teachings of Zhang refer to what the sender does when, due to traffic and not any actions by the receiver, is not receiving ACKs and DOES NOT refer to the receiver changing the "*rate at which receipt acknowledgements (ACKs) are communicated from the receiver to the sender*", as recited in Applicant Claim 26, and similarly recited in Applicant's amended independent claims.

Furthermore, it will be noted that Zhang does not discuss the sender changing back-to-back packet train sending in response to receiving fewer ACKs; because in fact there is no mechanism discussed in Zhang for using the rate of ACK sending from the receiver to control back-to-back packet train sending.

To assure a proper understanding of the phrase "*said rate at which acknowledgements are communicated*"; the Applicant has amended Claim 26 to include the recitation "*wherein said rate at which acknowledgements are communicated by the receiver comprises the number of back-to-back packets to be sent by the sender per each acknowledgment (ACK) as sent by the receiver.*" The above definition of "rate" is also included with slightly different wording in the other independent claims. It should be recognized that the rate of ACKS generated by the receiver, recited in Applicant claims, can not be simply equated to congestion on the link, but is an active change by the receiver to how often ACKs are sent, an example of which is taught in the specification, for example as "*such as once for every two packets received (i.e., m = 2).*" And that this element interoperates with the sender which then changes the number of back-to-back packets sent in response this ACK rate defined as "*number of back-to-back packets to be sent by the sender per each acknowledgment (ACK) sent by the receiver*".

Thus, Zhang provides nothing which can be said to teach or suggest the receiver changing the number of packets per ACK to control the number of back-to-back packets sent by the sender, as taught within Applicant Claim 26. These features are admittedly not taught or suggested by Patel and Matsunaga.

As discussed above, Applicant Claims 1, 14 and 27 have been amended to incorporate the "rate" material from Claim 26, and its definition.

Claim 1 has been amended to incorporate the following recitation:

> "means for the receiver to control sender packet train size in response to bandwidth estimations by changing a rate value m at which receipt acknowledgements (ACKs) are communicated from the receiver to said sender, and in response to which the sender transmits a corresponding number of packets back-to-back;
>
> wherein said rate value m is the rate at which acknowledgements are communicated from the receiver to control the number of back-to-back packets to be sent by the sender per acknowledgment (ACK) sent by the receiver."

Claim 14 has been amended to incorporate the following recitation:

> "controlling the length of packet trains transmitted by the sender in response to modifying the rate at which receipt acknowledgements (ACKs) are communicated from the receiver to the sender to which the sender transmits a corresponding number of packets back-to-back;
>
> wherein said rate at which acknowledgements are communicated by the receiver comprises the number of back-to-back packets to be sent by the sender per acknowledgment (ACK) sent by the receiver."

Claim 27 has been amended to incorporate the following recitation:

> altering the rate at which receipt acknowledgements (ACKs) are communicated from the receiver to the sender as based on estimated network bandwidth whereby the sender transmits a corresponding number of packets back-to-back;
>
> wherein said rate at which acknowledgements are communicated by the receiver comprises the number of back-to-back packets to be sent by the sender per acknowledgment (ACK) sent by the receiver;

It is readily seen that each of the above portions of the amended claims recites

the sender altering the rate of ACKs to control the number of packets to be sent back-to-back by the sender. Thus, each of the above independent claims recite elements for which there is no teaching within each of the references, whether considered separately or in combination with one another and what is known in the art.

Specifically, the Patel, Matsunaga and Zhang references, whether considered separately, or in combination with each other and what is known to those of ordinary skill in the art, does not teach every limitation of Claims 1, 14, 26 and 27. As noted in the MPEP,

> 2143.03 All Claim Limitations Must Be Taught or Suggested
> To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

Therefore, the Applicant respectfully requests that the rejection of Claims 1, 14, 26 and 27, and the claims which depend therefrom, be withdrawn and those claims be allowed.

2. <u>Rejection of Claim 25 under 35 U.S.C. § 103(a)</u>.

Claim 25 was rejected under 35 U.S.C. § 103(a) as unpatentable over Patel et al. (U.S. Patent No. 6,731,600) in view of Official Notice.

Claim 25 depends from an independent claim whose patentability has been shown; accordingly, Claim 25 should be considered *a fortiori* allowable.

Therefore, Applicant respectfully requests that the rejection of Claim 25 be withdrawn and that Claim 25 be allowed.

3. Amendment of Claims 1, 10, 14, 24, 26-27 and 34.

Claims 1, 14, and 26-27. Independent Claims 1, 14, and 27 were amended to recite receiver changes of the ACK rate as found previously within dependent Claims 10, 24 and 36, as well as within independent Claim 26. In addition, portions of the ACK "rate" definition from paragraph [0078] of Applicant's specification is incorporated within Claims 1, 14, 26 and 27. The form of explicit marking of the MSS to indicate back-to-back packet state has been removed from Claims 1 and 14, and conferred to dependent claims. Claim 26 has been amended to alternatively recite explicit marking using at least one packet header bit as was previously recited in the application and found in Claim 32 as originally filed.

Claims 10 and 24. The material of Claims 10 and 24 have been combined with their respective base claims, and these claims amended to recite the mechanism for explicitly indicating back-to-back packets, as was previously recited within independent Claims 1 and 14.

Claim 34. Dependent Claim 34 was amended to depend from independent Claim 27 as a result of canceling Claim 33, the material from which was already recited within independent Claim 27.

4. Amendments Made Without Prejudice or Estoppel.

Notwithstanding the amendments made and accompanying traversing remarks provided above, the Applicant has made these amendments in order to expedite allowance of the currently pending subject matter. However, the Applicant does not acquiesce in the original ground for rejection with respect to the original form of these claims. These amendments have been made without any prejudice, waiver, or estoppel, and without forfeiture or dedication to the public, with respect to the original subject matter of the claims as originally filed or in their form immediately preceding these amendments. The Applicant reserves the right to pursue the original scope of these claims in the future, such as through continuation practice, for example.

5. Conclusion.

Based on the foregoing, the Applicant respectfully requests that the various grounds for rejection in the Office Action be reconsidered and withdrawn with respect to the presently amended form of the claims, and that a Notice of Allowance be issued for the present application to pass to issuance.

In the event any further matters remain at issue with respect to the present application, the Applicant respectfully requests that the Examiner please contact the undersigned below at the telephone number indicated in order to discuss such matter prior to the next action on the merits of this application.

Dated: 03/11/2010

Respectfully submitted,

/Rodger H. Rast/

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